

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

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In the Matter of)

Advanced Television Systems)
and Their Impact Upon the Existing)
Television Broadcast Service)

MM Docket No. 87-268

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**FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY**

COMMENTS OF INTEL CORPORATION

Intel Corporation ("Intel"), pursuant to Section 1.415 of the Commission's rules, hereby submits its comments in response to the Commission's *Fifth Further Notice of Proposed Rule Making* in the above-captioned proceeding, which seeks comment on the Commission's proposal to adopt the Advanced Television Systems Committee Standard ("ATSC Standard") as the standard for digital broadcasting in the United States.^{1/} Intel commends the Commission for its tremendous efforts to promote a digital transmission standard for television broadcasting. Digital technology is essential for ensuring interoperability between television sets and computer systems and will greatly expand the potential uses of the ATV service. Intel urges the Commission to refrain, however, from adopting the ATSC Standard in its entirety as the standard for digital broadcasting because several aspects of that standard will inhibit technological innovation and undermine the full utilization of the digital broadcast technology by consumers. Rather, the Commission should allow the marketplace to determine several aspects of the transmission standard for digital broadcasting

^{1/} *In re* Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, *Fifth Further Notice of Proposed Rule Making*, MM Dkt. No. 87-268, FCC 96-207 (rel. May 20, 1996) ("ATV Standard Notice").

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to ensure the provision of a high quality digital television signal, to promote the most efficient use of the spectrum, and to optimize the educational, informational and entertainment benefits of digital television for consumers. To the extent the Commission adopts the proposed ATSC Standard, however, Intel urges the Commission, to implement the following changes with respect to the proposed standard: (1) ensure that the standard's transport layer demonstrates the ability to deliver executable code; (2) recommend rather than require image formats, and consider other approaches with respect to the format issue, such as the "base-line" format proposed by CICATS; (3) allow digital licensees to use the best available technology, such as alternative coding and compression techniques; and (4) do not regulate receivers beyond ensuring that they do not interfere with other equipment.

I. INTRODUCTION AND OVERVIEW

In the last decade, the computer industry has experienced a technological evolution that has significantly altered the way consumers create, access and distribute information. These major changes in the computer industry have been made possible by innovative technological advances in digital applications being provided to consumers at ever diminishing costs.

Now that digital technology is possible for television broadcasting, the services and interactive applications that can be provided through interoperability of the computer and television media is virtually limitless. To realize the benefits that are possible with such interoperability and to optimize the use of the ATV service, however, it is critical that the Commission allow the marketplace to shape the future of digital broadcasting. The marketplace will ensure that consumers continue to receive free and universally available traditional broadcast applications, such as delivery

of sports, news and entertainment, while providing incentives for the industry to promote technological innovation and the availability of new products and services to consumers over the digital broadcast medium.

Intel understands that the ATSC Standard attempts to reach a compromise between many conflicting goals, which may require the continued use of old technologies, at least during the transition period. The proposed standard, however, heavily favors traditional TV manufacturers and broadcast interests at the expense of consumers and the computer industry. The proposed standard does not permit consumers to realize the full potential of digital broadcasting to the extent the standard limits interoperability and compatibility between computer and television systems.^{2/}

II. ADOPTING THE ATSC STANDARD IN ITS ENTIRETY FOR DIGITAL BROADCASTING WILL DETER THE GROWTH AND THE POTENTIAL OF THE ATV SERVICE.

Intel urges the Commission to refrain from adopting the proposed ATSC Standard in its entirety for digital broadcasting television service. Adoption of several aspects of the proposed standard will prevent consumers from taking advantage of the rapid changes in the development of digital technology, which promises to provide to consumers new and innovative opportunities for the provisioning and uses of the ATV service. Indeed, the Commission recognizes that this digital technology is still in its infancy and that "further advances are likely to occur." *ATV Standard*

^{2/} Intel strongly supports the proposed ATSC Standard to the extent that it employs digital technology. A digital transmission standard is essential to ensure interoperability between television sets and personal computers. The ATSC Standard, however, must be improved so that the technology employed has the capability to transport not only images and sounds, but computer files and in particular executable code. Intel intends to work with the ATSC to ensure that this goal is achieved.

Notice ¶ 33. As the Commission correctly recognizes, adopting an inflexible standard for digital broadcasting could “lock the broadcast market into [a] less than optimal technology.” *ATV Standard Notice* ¶ 34.

The Commission’s goals in this proceeding include the adoption of rules that promote the rapid introduction of digital television broadcasting that will “allow the public to receive the benefits of digital television while taking account of consumer investment in NTSC television sets” and “ensuring that the spectrum . . . will be used in a manner that best serves the public interest.”^{3/} To realize its goals and optimize the multiple applications possible with the ATV service, however, the Commission cannot limit consumers and the industry to the ATSC Standard. If the Commission adopts all aspects of the ATSC Standard as proposed, it will undermine both its goal to ensure free and universally available digital broadcasting television services and its goal of encouraging technological innovation. *ATV Standard Notice* ¶ 33.

Several aspects of the proposed ATSC Standard inhibit interoperability between computers and television sets, thereby diminishing the products and services that could be made available to consumers through this digital technology. Specifically, the proposed ATSC Standard imposes, rather than removes, several barriers to computer applications, by either reducing the quality of the images or increasing the cost of the equipment required to perform the various format conversions. In particular, the use of interlaced scanning, non-square pixel aspect ratios, and the 60Hz frame rates does not permit the use of graphics and textual images necessary for many computer applications.

^{3/} See Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, *Fourth Notice of Proposed Rule Making*, FCC 95-315, MM Dkt. No. 87-268, para. 6 (rel. Aug. 9, 1995).

In its *ATV Standard Notice*, the Commission noted that the Advisory Committee on Advanced Television Services ("ACATS") "believes the [ATSC Standard] adequately addresses" the factors necessary to ensure the interoperability of the ATSC Standard with alternative media. Intel believes that "adequate" is a fair description of the level of interoperability achieved by the proposed standard. Intel also believes, however, that while "adequate" may be sufficient for a recommendation with respect to several aspects of the proposed standard, it is insufficient for a legal mandate.

III. IF THE COMMISSION ADOPTS THE PROPOSED ATSC STANDARD IT SHOULD IMPLEMENT CERTAIN CHANGES TO THE STANDARD.

If the Commission adopts the proposed ATSC Standard, Intel urges the Commission to implement the following changes with respect to the proposed standard: (1) ensure that the standard's transport layer demonstrates the ability to deliver executable code; (2) consider the "base-line" format proposed by ACATS as an alternative to the 18 image format; (3) permit digital licensees to choose the best available technologies, such as alternative coding and compression techniques; and (4) refrain from imposing any regulatory requirements on receivers beyond preventing cross-interference. If the proposed ATSC Standard is adopted, the Commission should implement the foregoing changes. Otherwise, consumers will be confined to a technology that limits the products and services available to them, resulting in an inefficient use of the spectrum. Such a result is contrary to the public interest and to the Commission's stated goals.

A. *The Transport Layer of the Proposed Standard Should Demonstrate the Ability to Deliver Executable Code (Programs).*

The proposed ATSC Standard utilizes a transport layer that is a compatible subset of the MPEG-2 systems standard that delivers digital data in fixed-length packets of information. *ATV Standard Notice* ¶ 15. Within the transport layer, these packets of video, audio and ancillary data are combined to “ensure that the sound, pictures and closed captioning information can be synchronized at the receiver.” *Id.* The proposed ATSC Standard, however, does not specifically *verify* the ability of the transport layer to efficiently carry data other than video and audio. In particular, many of the most significant computer applications of the ATV medium such as interactive entertainment and education require delivery of executable code (programs). Unlike video and audio, which can incur errors from which the receiver will eventually recover, albeit with a temporary artifact noticeable by the user, executable code can be rendered useless by extremely minor errors. While it appears that the goal of code transport can be accomplished by layering additional forward error correction protocols on top of the transport layer, no data exists on either the reliability or the efficiency of this approach. If the Commission mandates the proposed ATSC Standard, it should require that the standard demonstrate an ability to delivery executable code with reasonable efficiency. This is not a request for a mandated error correction scheme; the industry can select from among several. The Commission should, however, ensure that at least one scheme is shown to be reasonably efficient.

B. *The Commission Should Consider the CICATS Base-line Format Proposal as an Alternative, Less Expensive Way to Ensure Ubiquity of Access.*

The Commission is correct in recognizing that television today is “a ubiquitous service” that is “relied upon by a majority of Americans as their primary news and information source.” *ATV Standard Notice* ¶ 31. Intel supports and commends the Commission’s goal to preserve a free and universally available broadcast television service. If the Commission does not consider, however, alternative format proposals, the consumer is in essence being forced to buy a piece of equipment that is capable of trans-converting 18 image formats of programming in order to maintain this ubiquitous access. A fundamentally different approach towards solving this problem is described in the “base-line” format proposed by the Computer Industry Coalition on Advanced Television Service (“CICATS”), which would accomplish the goal of ubiquitous access with less cost to the consumer.^{4/} The CICATS proposal permits the simultaneous transmission of both high definition television programming and standard definition television programming, thereby eliminating the need for consumers to purchase more costly equipment necessary to decode programming derived from multiple formats. Intel urges the Commission to consider incorporating the CICATS base-line format proposal into the ATSC Standard to the extent the Commission adopts the proposed standard.

^{4/} CICATS, of which Intel is a member, is filing separate comments in this proceeding that set forth in detail its base-line format proposal. This proposal is aimed at optimizing the interoperability of computers and television sets, and therefore the products and services available to consumers, while lowering the costs associated with receiving such services.

C. *Digital Licensees Should be Required to Use the RF/Transmission Layer While Permitting Them to Choose Alternative Coding and Compression Technologies.*

In its *ATV Standard Notice*, the Commission seeks comment on whether it would be “desirable to require digital licensees to use the RF/transmission layer of the ATSC DTV Standard while leaving them free to choose coding and compression technologies different from those described in the ATSC DTV Standard.” *ATV Standard Notice* ¶ 48. Intel strongly supports the idea of requiring the use of the RF/transmission layer of the proposed ATSC Standard (the part of the standard that ensures delivery of bits from one place to another) once its ability to transmit executable code is confirmed, while leaving the market to select the most efficient schemes for using the same bits to transmit images, sound or other data (*i.e.* the part of the standard that defines what the bits mean). The laws of physics governing RF transmission are not expected to change much in the foreseeable future, while breakthroughs are occurring at an increasing pace in digital video and audio compression, resulting in the emergence of a variety of new and innovative multimedia, video, voice and data applications of digital technology. Maintaining the RF/transmission layer requirement, but allowing the use of the best available technologies, such as alternative coding and compression techniques, would ensure that new applications of the best available technologies, such as digital broadcasting technology, do not interfere with existing service, while promoting the best use of the digital technology without the need for regulation.

D. *The Commission Should Not Regulate Receivers.*

In its *ATV Standard Notice*, the Commission also seeks comment on whether the Commission should require receivers (and set-top boxes designed to receive ATV broadcasts for display on NTSC sets) to be able to receive all digital television programming formats. *ATV*

Standard Notice ¶ 66. Intel urges the Commission not to place any requirements on receivers beyond what is necessary to prevent cross-interference between equipment. The Commission also should not require the use of only “all format” receivers.^{5/} Rather, the Commission should merely require that consumers be advised of all the formats that a particular receiver offers so that the consumer can decide, for example, whether a pocket TV or a living room theater best suits their needs and budgets.

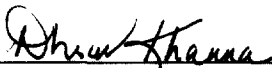

^{5/} If a computer equipped with a TV tuner were to be considered a receiver, which Intel believes is not the case, the Commission would be doing a great disservice to the computer user by first selecting several formats not suitable for computer display and then forcing the consumer to buy an expensive device that attempts to correct the problem.

IV. CONCLUSION

For the foregoing reasons, Intel urges the Commission to refrain from adopting the proposed ATSC Standard in its entirety as the standard for digital broadcasting. As proposed, several aspects of the ATSC Standard undermine the Commission's goal of encouraging technological innovation of digital television broadcasting and impede the growth and potential of the ATV Service. To the extent that the Commission adopts the ATSC Standard, however, the Commission should implement the following requirements in the currently proposed standard: (1) ensure that the standard's transport layer permits the delivery of executable code; (2) recommend rather than require image formats, and consider other approaches with respect to the format issue, such as the "base-line" format proposed by CICATS; (3) allow digital licensees to use the best available technologies, such as alternative coding and compression techniques; and (4) do not regulate receivers beyond ensuring that they do not interfere with other equipment.

Respectfully submitted,

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CERTIFICATE OF SERVICE

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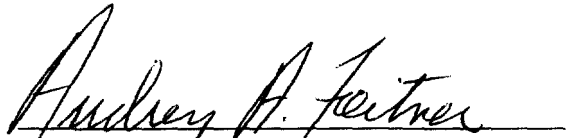
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